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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/785,194	02/25/2004	Yoshihiro Tsukuda	914-178	3361
23117	7590	12/10/2004	EXAMINER	
NIXON & VANDERHYE, PC 1100 N GLEBE ROAD 8TH FLOOR ARLINGTON, VA 22201-4714			DIAMOND, ALAN D	
			ART UNIT	PAPER NUMBER
			1753	

DATE MAILED: 12/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/785,194

Applicant(s)

TSUKUDA ET AL.

Examiner

Alan Diamond

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 18 October 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 3,7,9 and 23-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 3,7,9 and 23-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☒ Certified copies of the priority documents have been received in Application No. 09/723,278.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Comments***

1. The objection to the drawings has been overcome by Applicant's amendment of the specification so as to include reference sign 5.
2. The Examiner acknowledges that claim 1 has been canceled.
3. The 102(e) rejection of claims 3, 7, and 9 over Yoshida et al (U.S. 6,413,313) has been overcome by Applicant's amendment of claim 3 (which is now independent) so as to require that the base includes protrusions and grooves, and that the grooves have V and/or U shaped sectional views. Yoshida et al's base plate (8) has protruding, separate dots (41) (see Figure 7), but does not have grooves having a V and/or U shaped sectional views.
4. The Examiner acknowledges the statement, with respect to 35 USC 103(c), in the Remarks (filed 10/18/2004, pages 6 and 9), that Yoshida et al is commonly owned with the instant application, and was commonly owned at the time of the invention. Accordingly, Yoshida et al can no longer be used as a reference under 35 USC 103.

### ***Claim Objections***

5. Claim 7 is objected to because of the following informalities: In claim 7, at line 2, the comma after the word "carbide" should be deleted. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the

art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 3, 7, 9, 24-26, and 28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In each of independent claims 3 and 24, a base having grooves that have both V and U shaped sectional views is not supported by the disclosure, as originally filed. The disclosure, as originally filed, does support V or U shaped sectional views on a base (see, for example, page 7 lines 5-15; originally filed claim 17; and Figures 1 and 15). However, the use of grooves having both V and U shaped sectional views on the base is not supported. The same applies to dependent claims 7, 9, 25, 26, and 28. It is suggested that the term "V and/or U" be changed to "V or U" at line 4 of claim 3, and at line 3 of claim 24.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 3 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Wakefield et al, U.S. Patent 4,688,623.

Wakefield et al '623 teaches a method of manufacturing a silicon ribbon, wherein a roller (38) with protrusions (54,66) and grooves (52,64) on its peripheral surface is

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dipped into molten silicon (32), and crystals are formed on said protrusions (see also Figures 1, 2, 4, and 5; and col. 2, line 21 through col. 4, line 50). The grooves (52) have a U shaped cross section (see Figure 4); and the grooves (64) have a V shaped cross section (see Figure 5). Said protrusions are cooled, and Wakefield et al '623 teaches that the textured surface of said roller (38) establishes a plurality of crystal nucleation sites with controlled heat extraction (see the paragraph bridging cols. 2 and 3). The protrusions can be linear or dot (see Figures 3-5). Since Wakefield et al '623 teaches the limitations of the instant claims, the reference is deemed to be anticipatory.

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 3, 7, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wakefield et al, U.S. Patent 4,688,623 in view of JP 10-29895, here referred to as JP '895, and JP 59-78920, herein referred to as JP '920

Wakefield et al '623 teaches a method of manufacturing a silicon ribbon, wherein a roller (38) with protrusions (54,66) and grooves (52,64) on its peripheral surface is dipped into molten silicon (32), and crystals are formed on said protrusions (see also Figures 1, 2, 4, and 5; and col. 2, line 21 through col. 4, line 50). The grooves (52) have a U shaped cross section (see Figure 4); and the grooves (64) have a V shaped cross section (see Figure 5). Said protrusions are cooled, and Wakefield et al '623 teaches

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that the textured surface of said roller (38) establishes a plurality of crystal nucleation sites with controlled heat extraction (see the paragraph bridging cols. 2 and 3). The protrusions can be linear or dot (see Figures 3-5). Wakefield '623 teaches the limitations of the instant claims other than the difference which is discussed below.

Wakefield et al '623 does not specifically teach that its protrusions on the surface of the roller are coated with, for example, silicon carbide (SiC) or silicon nitride (SiN). JP '895 teaches the preparation of silicon ribbon, wherein its roller has a SiN coating, so as to provide heat resistance to the roller (see paragraphs 0006 and 0013). JP '895 teaches that its roller's surface need not be flat, and can have U- and V-shaped features (see paragraph 0030). JP '920 prepares silicon ribbon, wherein its roller is coated with SiC to help reduce damage to the roller (see the attached English abstract; and the entire JP '920 document). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided Wakefield et al '623's roller, including the protrusions, with a coating of SiN or SiC so as to protect the roller, as taught by JP '895 and JP '920.

12. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wakefield et al '623 in view of JP '895 and JP '920 as applied to claims 3, 7, and 9 above, and further in view of JP 63-201093 (herein referred to as JP '093) and JP 2-289484 (herein referred to as JP '484).

Wakefield et al '623 in view of JP '895 and JP '920, as relied upon for the reasons recited above, teaches the limitation of claim 25, the difference being that Wakefield et al '623 in view of JP '895 and JP '920 does not specifically teach that the

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protrusions on the surface of Wakefield et al '623's roller are coated with boron nitride (BN) or pyrolitic carbon. However, as noted above JP '895 and JP '920 teach SiN or SiC to protect the roller. JP '093 teaches the interchangeability of SiN, SiC, and BN as heat-resistant, inactive protection materials in the growth of crystals (see the attached English abstract). Likewise, JP '484 teaches the interchangeability of pyrolitic carbon and SiC (see the attached English abstracts). In the absence of anything unexpected, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have substituted the SiN or SiC of Wakefield et al '623 in view of JP '895 and JP '920 with BN or pyrolitic carbon because the substitution of art recognized equivalents, as shown by JP '093 and JP '484, would have been within the level of ordinary skill in the art.

### ***Double Patenting***

13. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

14. Claims 3, 7, 9, and 23-29 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-10 of U.S.

Patent No. 6,596,075. Although the conflicting claims are not identical, they are not patentably distinct from each other because the cooling plate in the claims of said patent can have protrusions and grooves (see claims 5 and 6, and figures 20-24).

15. Claims 3, 7, 9, and 23-29 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 4, 8, 10, 13, 16-21, and 23-25 of copending Application No. 10/323,666. Although the conflicting claims are not identical, they are not patentably distinct from each other because the silicon in the claims of said copending application is a species of the instant semiconductor material.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Response to Arguments***

16. Applicant's arguments filed October 18, 2004 have been fully considered but they are not persuasive.

Applicant argues that the prior art fails to disclose or suggest the subject matter in instant claim 3. However, as noted above, Wakefield et al anticipates claim 3.

Applicant argues that the amendment to claim 3 has overcome the obviousness-type double patenting rejection. However, this argument is not deemed to be persuasive because it is the Examiner's position that the obviousness-type double patenting rejection and the provisional obviousness-type double patenting rejection are still proper.

### ***Conclusion***



17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alan Diamond whose telephone number is 571-272-1338. The examiner can normally be reached on Monday through Friday, 5:30 a.m. to 2:00 p.m. ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

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Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Alan Diamond  
Primary Examiner  
Art Unit 1753

Alan Diamond  
December 8, 2004

A handwritten signature in cursive script, appearing to read "Alan Diamond", with a long horizontal flourish extending to the right.